

REMARKS

The Examiner is thanked for the thorough review and consideration of the present application. The Advisory Action dated October 2, 2003 has been received and its content carefully reviewed.

By this Response, claims 4, 17 and 35 have been amended. No new matter has been added. Claims 2-40 are pending in the application with claims 39 and 40 being withdrawn from consideration. Reconsideration and withdrawal of the rejections are requested based upon the above amendments and the following remarks.

In the Office Action, claims 2, 4, 5, 7, 10, 11, 12, 17, 18 and 33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's Related Art (hereafter "Related Art") in view of U.S. Patent No. 6,362,858, issued to Jeon et al. (hereafter "Jeon"). Claims 13-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon in view of U.S. Patent No. 6,323,918, issued to Yoshioka et al. (hereafter "Yoshioka"). Claims 3, 6, and 34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon and further in view of U.S. Patent No. 6,278,502, issued to Colgan et al (hereafter "Colgan"). Further, claims 8-9 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon and further in view of U.S. Patent Publication No. US 2002/0008824, issued to Son et al. (hereafter "Son"). Claims 19, 23-25 and 27-30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon, and further in view of U.S. Patent No. 6,219,125, issued to Ishikura (hereafter "Ishikura"). Claim 26 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon and Colgan, and further in view of U.S. Patent No. 6,094,250, issued to Choi et al. (hereafter "Choi"). Claim 31 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon and Ishikura, and further in view of Colgan. Claims 20, 21 and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon, and further in view of Choi. Claims 35 and 38 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon and Yoshioka, and further in view of U.S. Patent No. 6,356,328, issued to Shin et al. (hereafter "Shin"). And, claims 16, 36 and 37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Related Art in view of Jeon, Yoshioka and Shin, and further in view of U.S. Patent No. 6,049,365, issued to Nakashima.

Applicant traverses the rejections because neither the Related Art, Jeon, Yoshioka, Colgan, Son, Ishikura, Choi, Shin nor Nakashima, analyzed alone or in any combination, teaches or suggests an in-plane switching liquid crystal display device having the combined features recited in the claims of the present application. Specifically, the applied references fail to teach or suggest “a gate line formed of a first material on a first substrate” and “a plurality of common electrodes on the first substrate...,” the common electrodes being of a transparent conductive second material different from the first material,,” as recited in independent claims 4 and 17, and “a gate line on the first substrate” and “a plurality of common electrodes of a transparent conductive second material different from the first material on the first substrate” as recited in independent claim 35.

Jeon discloses a method of manufacturing a fringe field switching (FFS) mode liquid crystal display device driving with fringe field between counter and pixel electrodes. The Office Action states on page 24 that “Jeon was applied to teach a layered structure to comprise an LCD device with a method that simplifies the process”. However, Jeon fails to teach the structure of the LCD device recited in the present application. In Jeon, “a first ITO layer and a first metal layer having a low resistivity are formed on a transparent insulating layer 30... The first metal layer and the first ITO layer are then patterned using a first mask to form a gate bus line 32a and defining a pattern portion 32b having counter electrode and common signal line regions” (see, col. 2, lines 50-58 and FIG. 2A). With regard to FIG. 2C of Jeon, “the pattern portion 32b is patterned using a third mask so as to expose the first ITO layer...” (see, col. 2, lines 64-66). Applicant respectfully submits the gate line 32a and counter electrode 31 of Jeon are formed of the same material, i.e., ITO. Thus, Jeon fails to teach or suggest “a gate line formed of a first material” and “common electrodes being of a transparent conductive material different from the first material” as recited in claims 4 and 17 of the present application.

Applicant further submits in independent device claim 17 of the present application, an in-plane switching liquid crystal display device includes, among other features, “a plurality of common electrodes on the first substrate... wherein the common electrodes are on a same layer of the first substrate as the gate line”. Also, in claim 17 of the present application, “the common electrodes alternate with and are parallel to the pixel electrodes”. Applicant respectfully submits Jeon fails to teach at least these structural limitations of claim 17. Specifically, Jeon discloses a single, plate-shaped counter electrode 31 that does not alternate with the comb-shaped pixel

electrode 37 (see, for example, FIG. 2E and col. 3, lines 22-23 in which “the pixel electrode 37 is overlapped with the counter electrode 31 and is in contact (CT) with the source 35a”).

Further, in the present application, “the common electrodes are arranged to directly contact the common line” as recited in claims 4 and 17. Whereas, in FIGS. 2C-2E of Jeon, the common signal line 32b-1 is formed in the edge of the pattern portion 32b and the counter electrode 31 does not directly contact the common line as recited in claims 4 and 17. Thus, Jeon fails to meet the requirements recited in claims 4 and 17, and further fails to provide motivation to one of ordinary skill in the art at the time of the invention to modify the Related Art to obtain an in-plane switching liquid crystal display device having the combined features recited in claims 4 and 17 of the present application. Accordingly, independent claim 4 and its rejected, dependent claims 2, 5, 7 and 10-12, and independent claim 17 and its rejected, dependent claims 18 and 33 are allowable over the Related Art and Jeon. Reconsideration and withdrawal of the rejection of claims 2, 4, 5, 7, 10, 11, 12, 17, 18 and 33 are requested.

As to the rejection of dependent claims 13-15, the Office Action concedes that the Related Art and Jeon “do not explicitly disclose a device further comprising a passivation layer over the gate insulating layer, a common electrode on the passivation layer, a black matrix on the passivation layer covering the active layer, wherein the black matrix is made of the same material as the pixel electrodes.” To compensate for the deficient teachings of the Related Art and Jeon, the Office Action relies upon Yoshioka. Based upon the teachings of Yoshioka, the Office Action states that “ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a passivation layer over the gate-insulating layer, a common electrode on the passivation layer, a black matrix on the passivation layer covering the active layer, wherein the black matrix is made of the same material as the pixel electrodes to form a capacitor comprising the black matrix to improve display performance”.

Yoshioka merely discloses a liquid crystal display device having a structure of multi-gate thin film transistor, but fails to teach or suggest, as discussed above, the combined features of the in-plane switching liquid crystal display devices as recited in independent claim 4, from which rejected claims 13-15 depend. As such, Yoshioka fails to remedy the deficient teachings of the Related Art and Jeon in a manner such that a combination of the Related Art, Jeon and Yoshioka would provide an in-plane switching liquid crystal display device having the combined features recited in independent claim 4. As such, rejected claims 13-15, by virtue of their dependence

from claim 4, are patentable over any combination of the Related Art, Jeon and Yoshioka. Reconsideration and withdrawal of the rejection of claims 13-15 are requested.

With regard to the rejection of dependent claims 3, 6 and 34, the Office Action concedes that the Related Art and Jeon fail to explicitly disclose a device “wherein the transparent conductive material includes indium zinc oxide (IZO)”. To compensate for this deficient teaching of the Related Art and Jeon, the Office Action relies upon the teachings of Colgan to allege that “ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use IZO as a preferred material for the formation of transparent conductive layers” and would modify the LCD of the Related Art in view of Jeon with the IZO of Colgan.

Applicant submits Colgan merely discloses capacitors for pixel display circuits having increased capacitance per unit area, reduced crosstalk and leakage (col. 4, lines 26-31). As such, Colgan fails to teach or suggest, as discussed above, features of an in-plane switching liquid crystal display device as recited in independent claims 4 and 17 what would remedy the deficient teaching of the Related Art and Jeon. Accordingly, one of ordinary skill in the art would not be motivated by the teachings of Colgan to modify the LCD in the Related Art by the teachings of Jeon and Colgan to provide an LCD device having the combined recited features of independent claims 4 and 17 of the present application. Therefore, rejected claims 3, 6 and 34 are patentable over the Related Art, Jeon and Colgan based upon their dependence from independent claims 4 and 17 discussed above. Reconsideration and withdrawal of the rejection of claims 3, 6 and 34 are requested.

With regard to the rejection of dependent claims 8, 9 and 32, the Office Action relies upon the teachings of Son to remedy the deficient teachings of the Related Art and Jeon. However, Son merely discloses an in-plane switching mode liquid crystal display device “that prevents or minimizes the formation of static electricity” (see paragraph [0015]. Applicant respectfully submits Son fails to teach or suggest the combined features recited in claims 4 and 17 that would remedy the deficient teachings of the Related Art and Jeon as discussed above. Accordingly, claims 8, 9 and 32, by virtue of their dependence from claims 4 and 17, are patentable over any combination of the Related Art, Jeon and Son. Reconsideration and withdrawal of the rejection are requested.

With regard to rejected dependent claims 19,23-25 and 27-30, the Office Action relies upon the teachings of Ishikura to allege that ordinary workers in the art would be motivated by

the teachings of Ishikura to modify the device of the Related Art and Jeon to obtain a LCD device having the combined features recited in the claims of the present application. With regard to dependent claim 26, the Office Action relies upon the teachings of Choi to suggest that one of ordinary skill in the art would be motivated to modify the Related Art and Jeon to obtain a LCD device having the combined recited features in the claims of the present application. Applicant disagrees.

Ishikura discloses “an electrode plate capable of improving adhesive properties (adhesiveness) between metal (first) electrodes and a substrate having thereon the metal electrodes while suppressing an oxidation of the metal electrodes and capable of providing stable electrical conduction of the metal electrodes to transparent (second) electrodes formed thereon” (col. 1, line 65 -col. 2, line 4). Choi discloses an IPS mode thin film transistor-LCD in which cross-talk is decreased by preventing the electric signal through a data electrode from affecting a pixel electrode.” Applicant respectfully submits neither Ishikura nor Choi teach or suggest an in-plane switching liquid crystal display device having all the combined features recited in independent claim 17. As such claim 17 and its rejected dependent claims 19, 23-25, 27-30 and 25 are patentable over the Related Art, Jeon, Ishikura and Choi. Reconsideration and withdrawal of the rejections of claims 19 and 23-30 are requested.

With regard to the rejection of dependent claim 31, the Office Action relies upon the teachings of the Related Art, Jeon, Ishikura and Colgan. With regard to the rejection of dependent claims 20-22, the Office Action relies upon the teachings of the Related Art, Jeon and Choi. Claims 31 and 20-22 depend from independent claim 17 as discussed above. Applicant respectfully submits neither the Related Art, Jeon, Colgan nor Choi teach or suggest the combined features of the in-plane switching liquid crystal display device recited in claim 17. Accordingly, claim 31 and 20-22 are patentable over any combination of the Related Art, Jeon, Colgan and Choi. Reconsideration and withdrawal of the rejection of claim 31 and 20-22 are requested.

With regard to the rejection of claims 35 and 28, the Office Action concedes Jeon does not disclose a pixel electrode formed of an opaque material. To compensate for this deficiency, the Office Action relies upon Shin. Applicant submits Shin discloses, in the Background Section, an IPS-LCD conventionally having a “branch 5b of the counter electrode and the second part 6b of the pixel electrode made of an opaque metal in order to block light” (col. 2,

lines 3-6); however, with this conventional arrangement, the Shin disclosure states “the aperture ratio is reduced” (col. 2, line 7). Thus, the conventional arrangement does not fulfill the “aim” of the Shin invention which is “to improve aperture ratio, transmittance and brightness of IPS-LCD devices” (col. 2, lines 19-21). These features were achieved in the Shin device by having a counter electrode and pixel electrode made of transparent material (see, for example, claims 1 and 15), not an opaque material. Claim 35 of the present application includes a plurality of common electrodes of “a transparent conductive second material” and “a plurality of pixel electrodes of an opaque metal”. Thus, Shin does not teach the use of an opaque material to form the pixel electrode (i.e., both the common and pixel electrodes are made of transparent conductive material, see, for example, claim 1 and 15). Additionally, Shin fails to teach “a plurality of pixel electrodes of an opaque metal contacting the drain electrode of the thin film transistor, . . . wherein the common electrodes are on a same layer of the first substrate as the gate line” as recited in independent claim 35 and its dependent claim 38. Accordingly, rejected claims 35 and 38 are patentable over the applied combination of the Related Art, Jeon and Shin. Reconsideration and withdrawal of the rejection of claims 35 and 38 are requested.

With regard to the rejection of claims 16, 36 and 37, the Office Action concedes Jeon and Shin fail to explicitly disclose a black matrix formed of the same opaque metal, Cr, as the pixel electrode. To compensate for this deficient teaching of Jeon and Shin, the Office Action relies upon the teachings of Nakashima. Applicant submits Nakashima discloses various embodiments of a liquid crystal display device including an in-plane switching mode liquid crystal display apparatus of a second embodiment (col. 7, lines 8-43 and claim 4) in which a transparent conductive film 54 may be used as the material of the pixel electrode. However, like Shin, Nakashima fails to teach or suggest the combined features recited in independent claims 4 and 35 as discussed above. Because Nakashima fails to teach or suggest the combined features of claim 35, Nakashima also fails to provide proper motivation to one of ordinary skill in the art to modify a combination of the Related Art, Jeon and Shin to obtain a device having the combined features recited in independent claim 35. As such, claim 35 and its rejected dependent claims 36 and 37, as well as rejected dependent claim 16, which depends from independent claim 4, are patentable over any combination of the Related Art, Jeon, Shin and Nakashima. Reconsideration and withdrawal of the rejection of claims 16, 36 and 37 are requested.

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In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejections of the claims and pass this application to issue. If the Examiner deems that a telephone conversation would further the prosecution of this application, the Examiner is invited to call the undersigned at (202) 496-7500.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911. A duplicate copy of this sheet is enclosed.

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